

# PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:  
MARK T. STARR  
UNISYS CORPORATION  
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BLUE BELL, PA 19424-0001

## PCT

NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL SEARCH REPORT AND  
THE WRITTEN OPINION OF THE INTERNATIONAL  
SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Date of mailing  
(day/month/year)

08 MAR 2005

Applicant's or agent's file reference  
USYS-0158/TN333

**FOR FURTHER ACTION** See paragraphs 1 and 4 below

International application No.  
PCT/US04/33253

International filing date  
(day/month/year) 07 October 2004 (07.10.2004)

Applicant  
UNISYS CORPORATION

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.
- Filing of amendments and statement under Article 19:**  
The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):
- When?** The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.
- Where?** Directly to the International Bureau of WIPO, 34 chemin des Colombettes  
1211 Geneva 20, Switzerland, Facsimile No.: +41 22 740 14 35
- For more detailed instructions, see the notes on the accompanying sheet.**
2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.
3. ☐ **With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:**
- ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.
- ☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

#### 4. Reminders

Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. These comments would also be made available to the public but not before the expiration of 30 months from the priority date.

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until **30 months** from the priority date (in some Offices even later); otherwise, the applicant must, within **20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

See the Annex to Form PCT/IB/301 and, for details about the applicable time limits, Office by Office, see the *PCT Applicant's Guide*, Volume II, National Chapters and the WIPO Internet site.

Name and mailing address of the ISA/ US  
Mail Stop PCT, Attn: ISA/US  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
Facsimile No. (703) 305-3230

Authorized officer

Rupal Dhanra

Telephone No. 703-305-3900

Form PCT/ISA/220 (January 2004)

(See notes on accompanying sheet)

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference USYS-0158/TN333	<b>FOR FURTHER ACTION</b>		see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/US04/33253	International filing date ( <i>day/month/year</i> ) 07 October 2004 (07.10.2004)	(Earliest) Priority Date ( <i>day/month/year</i> ) 08 October 2003 (08.10.2003)	
Applicant UNISYS CORPORATION			

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 9 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

**1. Basis of the Report**

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (See Box No. II)

3. ☐ **Unity of invention is lacking** (See Box No. III)

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☐ the text is approved as submitted by the applicant.

☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

a. the figure of the **drawings** to be published with the abstract is Figure No. 4

☒ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention.

b. ☐ none of the figures is to be published with the abstract.

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/33253

### Box IV TEXT OF THE ABSTRACT (Continuation of Item 5 of the first sheet)

The technical features mentioned in the abstract do not include a reference sign between parentheses (PCT Rule 8.1(d)). A virtualization infrastructure that allows multiple guest partitions (24,26,28) to run within a host hardware partition (10). The host system divided into distinct logical or virtual partitions (24,26,28) and special infrastructure partitions (12-14,16,18,20,22) are implemented to control resource management and to control physical I/O device drivers that are, in turn, used by operating systems in other distinct logical or virtual guest partitions (24,26,28). Host hardware resource management runs as a tracking application in a resource management "ultravisor" partition (14), while host resource management decisions are performed in a higher level command partition (20) based on policies maintained in a separate operations partition (22). The conventional hypervisor (32) is reduced to a context switching and containment element (monitor) for respective partitions (24,26,28), while the system resource management functionality is implemented in the ultravisor partition (14). The ultravisor partition (14) maintains the master in-memory database (33) of the hardware resource allocations and serves a command channel to accept transactional requests for assignment of resources allocations and serves a command channel to accept transactional requests for assignment of resources to partitions (24,26,28). It also provides individual read-only views of individual partitions (24,26,28) to the associated partition monitors. Host hardware I/O management is implemented in special redundant I/O partitions (16,18). Operating systems in other logical or virtual partitions (24,26,28) communicate with I/O partitions (16,18) via memory channels established by the ultravisor partition (14). The guest operating systems in the respective logical or virtual partitions (24,26,28) are modified to access monitors that implement a system call interface through which the ultravisor (14), I/O(16,18), and any other special infrastructure partitions (12-13, 20, 22) may initiate communications with each other and with the respective guest partitions (24,26,28). The guest operating systems are modified so that they do not attempt to use the "broken" instructions in the x86 system that complete virtualization systems must resolve by inserting traps.

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/33253

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G06F 12/10

US CL : 711/202, 129, 153, 173,6; 718/100;709/215

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 711/202, 129, 153, 173,6; 718/100;709/215

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
Please See Continuation Sheet

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,P	US 2004/0064668 A1 (KJOS et al) 01 April 2004 (01.04.2004), abstract, page 1, section 0006, page 2, section 0037, page 3, section 0038, page 6, section 0055-0059, page 7, section 0062-0066, page 8, section 0069, page 9, section 0072	1-33 and 48-75 ----- 34-47 and 76-86
Y,P		
Y,P	US 2004/0139437 A1 (ARNDT) 15 July 2004 (15.07.2004), abstract, fig.5, page 1, section 0007, page 2, section 0026, page 3, section 0027, page 4, section 0038 and 0041-0044	34-47 and 76-86
A,P	US 6,633,916 B2 (KAUFFMAN) 14 October 2003 (14.10.2003)	1-86
A,P	US 6,725,284 B2 (ARNDT) 20 April 2004 (20.04.2004)	1-86
A	US 2003/0110205 A1 (JOHNSON) 12 June 2003 (12.06.2003)	1-86

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

20 February 2005 (20.02.2005)

Date of mailing of the international search report

08 MAR 2005

Name and mailing address of the ISA/US

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# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US04/33253

Continuation of B. FIELDS SEARCHED Item 3:

EAST

search terms: para-virtualization, virtualization, operating system, virtual/logical partition, host, computer, sharing resources, plural os, virtual os